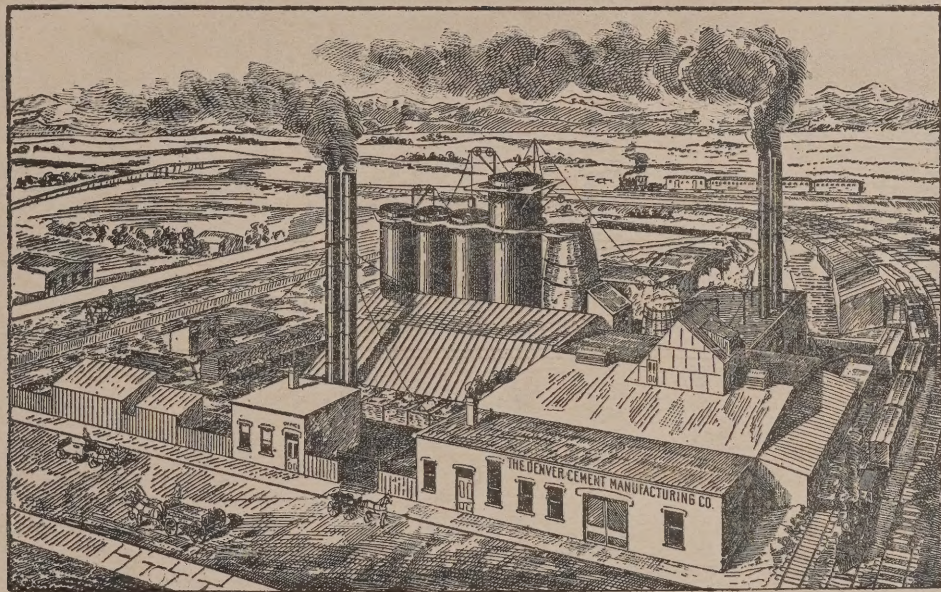


COMPLIMENTS OF

Denver Cement Manufacturing Co.



Corner Fourth and Wynkoop Sts.,

GEO. W. BRIGGS,
President and Manager.

DENVER, COLO.

DENVER, COLO. :
THE COLLIER & CLEVELAND LITHO. CO., PRINTERS,
1891.

THE DENVER CEMENT MANUFACTURING COMPANY.

Thomas Tonge Describes a Visit he Made to the Works of the Company.

THE DIFFERENCE BETWEEN NATURAL CEMENT AND PORTLAND CEMENT—PORTLAND CEMENT FAR AWAY THE BEST—COLORADO MATERIALS ALONE USED FOR DENVER PORTLAND CEMENT—HOW IT IS MADE—IT IS AS GOOD AS ANY, BUT CHEAPER, AND AS A HOME INDUSTRY DESERVES EVERY POSSIBLE LOCAL PATRONAGE—ALL PORTLAND CEMENT USED IN COLORADO MIGHT JUST AS WELL BE MADE IN COLORADO AND SO KEEP THE MONEY HERE.

AN EMINENT authority on the subject recently wrote that Cements, such as are used for constructive purposes, may be divided into two general classes, *natural* and *artificial*. The essential ingredients, carbonate of lime, silica, and alumina, are the same in both classes, the principal difference being the proportions in which they are present.

In the manufacture of *natural* Cement the raw material generally used is some stone, in which the carbonate of lime, silica and alumina are present in more or less correct



Equitable Building.

proportions, while in the manufacture of *artificial* Cement, the raw material used consists of the essential ingredients, each in a comparatively pure state, thoroughly mixed in theoretically the correct proportions. It is due to this fact that *artificial or Portland Cement is not only much superior to natural Cements, but that it is much more uniform in its quality. The feature of uniformity is the most valuable possessed by Portland Cements, and one which can never be attained in the manufacture of natural cements.*

The term *Portland Cement* is now generally used to designate artificial cement, from the fact that the first artificial cement made in England, when hardened, resembled the the famous Portland building stone.

It is a fact known to all engineers and builders that, as a class, *Portland Cements are slower setting than the natural cements; and also that natural cements attain their full strength within a comparative short time (within the first year as a maximum limit) and that after the full strength has been attained, this strength may decrease, as the time goes on, in some natural cements. There has, however, been found no limit of time beyond which Portland Cement deteriorated, and for two or three years at least it improves in strength.*



COLORADO MINING STOCK EXCHANGE.

DENVER MADE PORTLAND CEMENT.

The rapid development of the country tributary to Denver has resulted in the local manufacture from local materials of Portland or artificial cement of the highest quality and in annually increasing quantities.

The works of the Denver Cement Manufacturing Company are located on the entire block formed by Third, Fourth, Wazee and Wynkoop streets, except one corner of the block occupied by railroad tracks. These works were started so far back as 1882 by Professor Short and others, and after passing through various hands came into the possession of the above mentioned company, of which Mr. George W. Briggs is President.

A tour of inspection through the works amply repays a visitor. The first fact which presents itself is the high and complete character of the plant and equipment and the ingenuity of the labor-saving and waste-preventing appliances. The next fact is that *none but Colorado raw materials are used* as ingredients for the cement for they are the best that can be obtained anywhere for the purpose. The engine was made in Denver and has been running since 1882 and most of the machinery and plant is of Denver make.



The H. C. Brown Hotel.

Passing into the Works, the first place visited is the shed where the marl and lime-stone are unloaded from the railroad cars, the tracks of which run alongside the building. The marl comes partly from the foot-hills near Morrison, twelve miles from Denver, and partly from Colorado City, sixty miles from Denver. These marls are composed of carbonate of lime, alumina, oxide of iron, silica and a small percentage of alkalis. This material is in a fine state of subdivision and is found in the form of extensive deposits resulting from the disintegration of a shaly lime-rock through atmospheric influences. There is no better marl for the manufacture of Portland Cement to be found in the United States. The lime-stone also comes from near Morrison, and is passed from the receiving bins into the hopper of a special crushing machine, which grinds it into very fine powder.

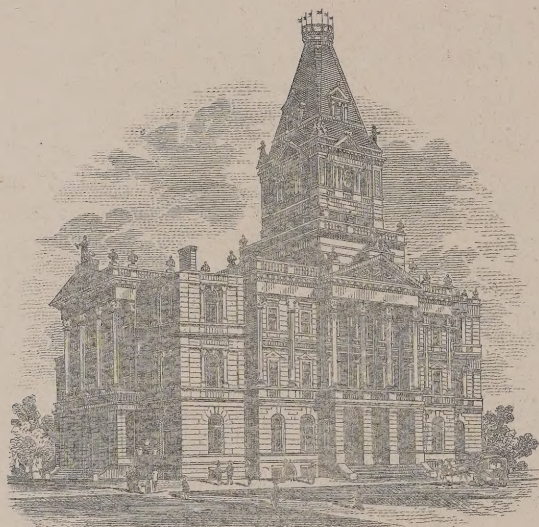
THE PROCESSES ADOPTED AND MACHINERY USED.

The marls and powdered lime, in certain proportions, are then put into machines called "beaters," where they are most thoroughly and effectually mixed. From the "beaters" the mixed material passes on into a "mud mill" or "brick mill," where it is moistened with water and emerges from the lower end of the mill in the shape of rough, wet bricks or loaves. These are placed on trays in separated layers, on small, peculiar cars



Kittredge Building.

or trucks (composed of transverse iron rods), and conveyed to a specially constructed drying apparatus, a series of parallel, long, narrow, low tunnels, just high enough and long enough to accommodate about a dozen cars of wet bricks, when the tunnel is closed at both ends and being heated by adjoining furnaces, the bricks are soon dried out. The moisture having been thus evaporated, the bricks are transferred to large and tall kilns, of which there are five, built of fire brick, with an outer casing or mantle of heavy sheet iron. These kilns are conspicuous objects from the Larimer street viaduct of the Denver City Cable Company. The charging of these kilns is an interesting process, as the dried bricks and coke are carefully placed in alternate thin layers from bottom to top. The kiln is then fired and in due time opened, when the bricks have all become what are known as "clinkers," having been burned almost to the point of vitrification. These clinkers are then shoveled out at the base of the opened kiln on to a broad, revolving, endless rubber band, running on drums, which carries the clinkers, deposited on it, up a moderate grade and automatically dumps them into the hopper of a "crusher," so that the contents of the kilns are conveyed to the "crusher" with the minimum of labor. The "crusher" reduces the clinkers to the size of small hazel nuts, and the material is then passed on to sets of grinding or "burr" stones, where it is further reduced in size, this time to the fineness of



New Post Office and Federal Building.

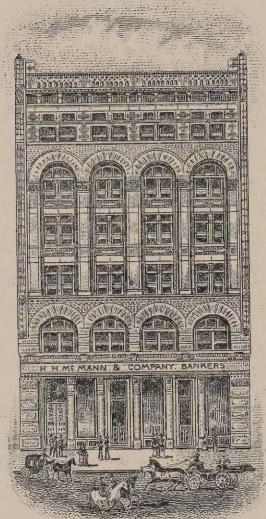
powder, as it is a well recognized fact by experts that the fineness to which Cement is ground is one of the most important points in its manufacture, for the reason that, if not finely ground, its strength may be reduced fifty or seventy-five per cent. Cement of the better grades is now usually ground so fine that only from five per cent. to ten per cent. of it is rejected by a sieve of 2,500 meshes per square inch, and it has been made so fine that only from three per cent. to ten per cent. is rejected by a sieve of 32,000 meshes per square inch. The finer the Cement, if otherwise good, the larger dose of sand it will take, and the greater its value.

From the "burr" stones the finished or powdered Cement passes along wooden flumes and spouts into large bins, each capacious enough to hold from 400,000 to 500,000 pounds.

In different parts of the works are Cement floors laid years ago, and, of course, in constant daily use since, which firmly resist damage by pick or crowbar, as the visitor can demonstrate for himself.

SCIENTIFIC SUPERINTENDENCE AND TESTS.

The next places visited are the Office and Laboratory. In the former is a fine "Standard" Cement Testing Machine from the works of Riehle Brothers of Philadelphia. During the construction of the pedestal for the Statue of Liberty on Bedloe's Island, New



Arapahoe Building.

York harbor, during a period of about eighteen months, one of these Riehle machines tested 18,000 "briquettes" or samples of Cement. The Laboratory contains all scientific apparatus necessary in this business for analyzing marls, lime-stone, mixtures, etc., also tanks for the storing of "briquettes" or specimens of Cement under water, before testing by the above mentioned machine. There is a chemist on the premises, every kiln is tested, detailed records kept, and never-ceasing vigilance exercised to keep up the high standard of excellence of the Cement manufactured at these Works.

The tests of Cement, as laid down by the Report of the Committee of the American Society of Civil Engineers, January 21, 1886, say that Portland Cement should show the following tensile strengths:

One day (one hour, or until set, in air, the rest of the twenty-four hours in water,) from one hundred pounds to one hundred and forty pounds.

One week (one day in air, six days in water,) from two hundred and fifty pounds to five hundred and fifty pounds.

One month (one day in air, twenty-seven days in water,) from three hundred and fifty pounds to seven hundred pounds.



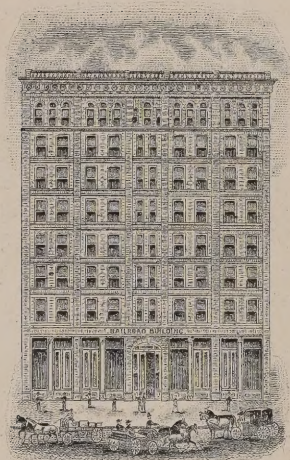
Barclay Block,

One year (one day in air, the remainder in water,) from four hundred and fifty pounds to eight hundred pounds.

The tests of the Portland Cement manufactured by the Denver Cement Manufacturing Company, average equally well with any English or imported Portland Cement, and the writer, during his visit, saw a specimen of Denver Portland Cement, one year old, tested on the machine which showed a tensile strength of nine hundred pounds.

DENVER CEMENT STANDS PRACTICAL TESTS.

The Company at present manufacture about three hundred sacks or thirty thousand pounds per day, but expect soon to turn out five hundred sacks per day. Their Cement has been extensively used by Contractors and Builders both in Denver and throughout Colorado. For instance, the conduits of the Denver Tramway Company's cable railway and the foundations for its heavy machinery have been exclusively constructed with the Cement of the Denver Cement Manufacturing Company, and wherever the Tramway Company have been compelled to make changes and alterations in their street lines, they have found the concrete so hard that large gads driven by heavy sledges were required to break up the mass, the granite used in making the concrete being frequently broken in two,



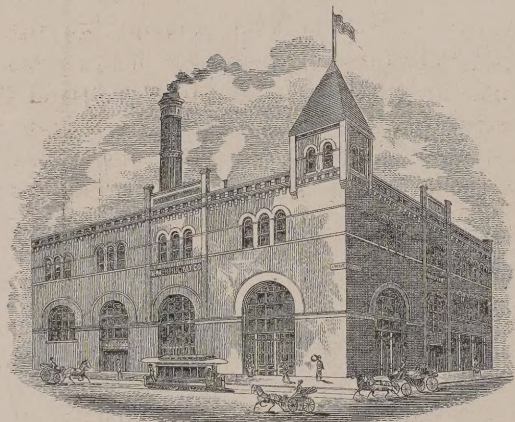
Railroad Building.

showing the great strength of the cement. Specimens of such concrete, with the granite stones torn asunder, are to be seen at the Works.

Cement from these Works has also been used in the construction of some of the recently erected large buildings in Denver, such as the new United States Post-office, the Barclay Block, the Kittredge Building, the Arapahoe Block, Brown's Hotel, the Mining Exchange, Wolf Hall, the new Union Pacific Railroad shops, the Burlington and Missouri Railroad round-house, etc., etc. Moreover, the Denver and Rio Grande Railway Company has used over 100,000 sacks of it; the Rio Grande Western Railway Company has purchased it for the last five or six years, while in the erection of the large, new gasometer of the Denver Gas Company, 6,000 sacks of it were used, in every one of the above cases the Cement giving full satisfaction.

MONEY SENT OUT OF THE STATE.

It is gratifying to know that the high quality of the Denver made Portland Cement has secured and is securing increased local recognition and that the works now produce four times as much per annum as they did prior to 1886, while the output will shortly be still further increased. But when it is borne in mind that it is estimated that probably 500,000 barrels or nearly 200,000,000 pounds of Portland Cement were used in Denver and Colorado during



Denver Tramway Company's Power House.

1890, it is evident that large quantities were imported from distant American points (for there is not another factory making Portland Cement within nearly a thousand miles of Denver) and from beyond the sea from England, France and Germany.

An eminent authority has pointed out that although English Portland Cements are among the best in the market, still they are equalled by both German and French Portland, while there are now manufactured in the United States Portland Cements that in tensile strength exceed any imported Cements. Specimens of American Portland have shown a tensile strength of 1,100 pounds at the end of twenty-six weeks. That being so, why purchase from abroad an article in no way superior to the American article? Further, why purchase from other States an article in no way superior to the Denver Portland Cement?

THE HOME PRODUCT.

In deciding between the claims of the Portland Cement of the Denver Cement Manufacturing Company and the imported Portland Cement, whether American or foreign, there are several things which should be remembered:

First—The Portland Cement of the Denver Cement Manufacturing Company is equal in quality to any imported Portland Cement as evidenced both by scientific tests of specimens and by practical tests of its durability wherever it has been tried.

Second—It is cheaper than any imported Portland Cement as shown by the following figures: The imported Portland Cement has to pay considerable freight, also commission to agents and dealers, and is sold in Denver at from \$3.75 to \$4.50 per barrel, the gross weight of the full barrel being 400 pounds and the net weight of the cement contents being 375 pounds. The Denver Cement Manufacturing Company sell their Portland cement at 80 cents per 100 pounds at the works, four sacks containing a full 400 pounds (or a gain to the purchaser of 25 pounds of cement over a barrel of imported cement) costing \$3.20, with an allowance of 5 cents on each returned sack, thus making the total cost of 400 pounds of Denver Cement \$3.00, or a difference of 75 cents to \$1.50 as against a barrel of 375 pounds of imported cement.

*Third—*The Denver Cement Manufacturing Company is "*A Home Industry*," already employing about twenty men at the works (exclusive of those engaged at the marl beds and limestone quarries), paying large annual sums in wages, which money is therefore kept in local circulation; utilizing entirely Colorado raw materials; already burning Colorado coal and coke to the amount of over \$5,000 per annum, and by such means keeping many thousands of dollars within the State, which would otherwise go out.

Surely the Colorado purchaser and user of Portland Cement, when he can get as good an article at home as he can from abroad and at the same time at a cheaper rate, will do well to patronize the Home Industry and help to build up the State and promote its prosperity by keeping local money in local circulation.

In conclusion, a visit to the works of the Denver Cement Manufacturing Company will fully confirm the above and amply repay any one who can spare the necessary time.

THOMAS TONGE.

VALUABLE INFORMATION.

SIDEWALKS

Should be made with a concrete foundation $3\frac{1}{2}$ inches thick, consisting of 1 part cement, 3 parts clean sand and 5 parts coarse gravel or broken stone, and this covered with a coating $\frac{1}{2}$ inch thick, consisting of equal parts cement and sand.

CELLAR FLOORS.

As for sidewalks, making the concrete foundation 2 or $2\frac{1}{2}$ inches thick.

CONCRETE.

1 sack of Denver cement, 3 sacks of sand and 5 sacks of coarse gravel or broken stone will make 21 square feet of concrete, $3\frac{1}{2}$ inches thick, or 36 square feet 2 inches thick, or 28 square feet $2\frac{1}{2}$ inches thick.

TOP COAT.

1 sack cement and 1 sack sand will make 53 square feet coating, $\frac{1}{2}$ inch thick.

Where cement work is exposed to the sun or strong currents of air, the work should be repeatedly sprinkled with water or covered to the depth of several inches with damp sand for 4 or 5 days.

SPECIMENS OF TESTIMONIALS.

Office of THE LANE AND BODLEY CO.,
S. E. COR. JOHN AND WATER STREETS,
CINCINNATI, OHIO, February 9, 1891. }

THE DENVER CEMENT MFG. CO.,
Denver, Colorado.

GENTLEMEN—I do not often write testimonials, have never before written one commending a Cement, although the quantity of both foreign and domestic manufacture I have used in cable railway conduits, buildings, machinery foundations, etc., in the Eastern, Western and Middle States, is very large.

It is a pleasure, however, to speak in the highest terms of the Cement made by you and used by me in the construction of the Denver Tramway. It was *uniform and reliable in quality, of great strength, and the deliveries were prompt and regular.*

As an evidence of strength, I would mention that *when our tracks were undermined and fell over into the excavation on Fifteenth street, that the concrete remained intact and was not renewed when tracks were jacked into position, the severest test of which I have any knowledge.*

Yours truly,

H. M. LANE.

Office of THE DENVER TRAMWAY COMPANY,
CORNER BROADWAY AND COLFAX AVENUE,
DENVER, COLORADO, January 22, 1891. }

G. W. BRIGGS, ESQ.,
President Denver Cement Mfg. Co.,
Denver, Colorado.

DEAR SIR—We have used upwards of 90,000 sacks of your Denver Portland Cement during the past thirty months, and have found it to be *best suited for all of our purposes*. Having used it in our engine and machinery foundations, sidewalks, floors, in the walls of our cable power house, boilers and chimney, and bridge foundations, besides over twenty miles of cable road-bed constructed on a concrete foundation made with a one-eighth portion of your Cement. I do not hesitate to pronounce it *far superior to all the domestic Cements I have ever seen and*, for our uses, as above, *equally as good as the best imported Cements*.

Yours truly,

JOHN A. BEELER,
Constructing Engineer.

DENVER, COLORADO, January 14, 1891.

THE DENVER CEMENT MFG. CO.

GENTLEMEN:—Replying to your request for my opinion as to the quality of your cement, I will say that I regard it as a first-class Portland Cement. I have had much experience in all kinds of cement work and in Providence, R. I., had charge of all cable railway construction in which the imported English Portland Cement, known as "Brooklyn Bridge Cement," was used. I have no hesitation in saying that the cement you furnished

the Denver Tramway Co., which was used under my personal supervision, to the cement used in the Providence cable railway.

R. TIERNEY,
Roadmaster Denver Tramway Co.
UNION PACIFIC SYSTEM, }
DENVER, COLORADO, January 14, 1891. }

MR. GEO. W. BRIGGS,
President Denver Cement Mfg. Co.,
Denver, Colorado.

DEAR SIR—I take pleasure in testifying to the merits of your “Denver Portland Cement,” which we have used in the construction of the new shops at this place. I consider it *superior to any domestic Cement that I have ever tried and equal to the imported “Portland” in every respect, with the advantage of being cheaper.*

Yours truly,

H. C. RELF,
Engineer in Charge,
New U. P. Shops.

UNION PACIFIC SYSTEM, }
DENVER, COLORADO, January 15, 1891. }

MR. GEO. W. BRIGGS,
General Manager Denver Cement Mfg. Co.

DEAR SIR—As inspector of masonry on the new Union Pacific shops, I have had a good opportunity to judge of the merits of your “Denver Portland Cement,” and I can cheerfully say that *it has given the best results*

under all conditions of any cement that I ever used. My experience extends over a space of thirty years, and in all that time, I have never seen any better concrete put in work than we have made with your cement.

Yours truly,

J. G. WATTS.

H. C. CHAPMAN,
CONTRACTOR,
DENVER, COLORADO, February 18, 1891. }

THE DENVER CEMENT MFG. CO.,

Denver, Colo.

GENTLEMEN—During the past year I have used over 13,000 sacks of your Denver Portland Cement in the construction of the Union Pacific Railway Company's new shops in Denver, *and have found it of uniform quality, fully equal to the best English Portland Cement, and far superior to most cements manufactured in this country.* During a period extending over many years of heavy railway construction and government work, *I have never found any cement that has given better satisfaction than that manufactured by you.*

Yours very truly,

H. C. CHAPMAN.

A. M. WELLES,
CIVIL, HYDRAULIC AND CONSULTING ENGINEER,
419 ERNEST & CRANMER BLOCK,
DENVER, COLORADO, January 3, 1891. }

G. W. BRIGGS,

General Manager Denver Cement Mfg. Co., City.

MY DEAR SIR—Having employed your cement in the construction of several pieces of work, notably that of the Castlewood dam, in which somewhat over fifteen thousand (15,000) sacks were used, and having tested it

thoroughly as to its tensile strength, the fineness to which it is ground, etc., *I am prepared to recommend it for general use, either in water or open air.* I have tested its strength under different settings with nearly every brand of English Portland Cement made, and find it quite equal in nearly every instance. I have passed it through a seventy (70) mesh seive, leaving a residue of only $3\frac{1}{2}$ per cent.

Very respectfully,

A. M. WELLES, C. E.

419 Ernest & Cranmer Building, Denver.

THE COLORADO CONSTRUCTION COMPANY,

(INCORPORATED.)

DENVER, COLORADO, January 7, 1891.

MR. GEO. W. BRIGGS,

President Denver Cement Mfg. Co.,

Denver, Colorado.

DEAR SIR—It is with pleasure we certify to the very many excellent qualities of the Denver Cement manufactured by your Company. We have within the last year used over fifteen thousand (15,000) sacks in the construction of the Castlewood Dam, and in no one instance has it failed. *We consider it in every particular equal to any Cement in the market, either Imported or Domestic, and to-day give it preference over all other makes.* You are at liberty to refer to us at any and all times.

Yours very truly,

H. C. BALLARD & CO.

DENVER, COLORADO, March 25, 1891.

G. W. BRIGGS, ESQ.,
Manager Denver Cement Mfg. Co.,
Denver, Colorado.

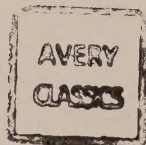
DEAR SIR—I have used your Cement since 1883 and have found it to be *entirely superior to any brand of Domestic Cement*; and in most cases entirely equal to English Portland. This is especially true of it since you began to make it in large quantities, so as to get a number of burnings thoroughly mixed. *I would prefer it for my own use to any other.*

Yours truly,

JOHN D. MCGILVRAY,
Masonry and Cut-Stone Contractor.

Mr. J. S. Brisbin, superintendent of construction on the Equitable Building, which will cost \$1,500,000, gives the following opinion of the Denver Portland Cement:

"We have used one hundred sacks of your cement in our building for a test, and found it entirely satisfactory."



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DENVER CEMENT MFG. CO.,

DENVER PORTLAND CEMENT

P.O. BOX 1854.
TELEPHONE 155.

OFFICE & FACTORY:
COR. FOURTH & WYNKOOP STS.
DENVER, COLO.

GEO. W. BRIGGS, President & Manager.